Claims:

1. A method of detecting manatee vocalizations, comprising the steps of:

detecting sounds in an underwater region;

generating a digital representation of said sounds;

filtering out sounds at unwanted frequencies from said digital representation, wherein filtered data in a frequency range of interest is maintained;

forming a plurality of overlapping time-windowed portions of said filtered data;

estimating, for each of said plurality of overlapping time-windowed portions, a power spectrum for frequency bins in said frequency range of interest;

normalizing, for each of said plurality of overlapping time-windowed portions, each said power spectrum for each of said frequency bins thereof using an average of power spectrums calculated over a plurality of said frequency bins, wherein a normalized spectrum value is defined for each of said frequency bins and wherein each said normalized spectrum value associated with broadband noise has a value that is less than each said normalized spectrum value associated with narrowband tones;

providing a lowest resonant frequency of interest associated with manatee vocalizations, wherein said lowest

resonant frequency has harmonics associated therewith;

filtering out, for each of said plurality of overlapping time-windowed portions, normalized spectrum values indicative of narrowband tones that occur (i) in windows of frequency bins encompassing frequencies lower and higher than each of said lowest resonant frequency and said harmonics thereof and (ii) with a specified degree of variance with respect to frequency separation therebetween, wherein a resulting number of said normalized spectrum values indicative of narrowband tones are maintained;

assigning, for each of said plurality of overlapping time-windowed portions, each said normalized spectrum value from said resulting number thereof to a frequency-based harmonic set, each of which is defined by a base frequency and resonances thereof; and

applying, for each of said plurality of overlapping time-windowed portions, a scoring routine that uses each said normalized spectrum value in each said harmonic set wherein a manatee vocalization is indicated when a threshold score is achieved across at least a portion of said plurality of overlapping time-windowed portions.

2. A method according to claim 1 wherein said step of estimating comprises the step of performing a periodogram on

each of said plurality of overlapping time-windowed portions.

3. A method according to claim 1 wherein said average of power spectrums used in said step of normalizing is based on frequency bins that are less than said frequency bin of said power spectrum being normalized if a first quantity is greater than a second quantity, said first quantity defined by said power spectrum being normalized minus an average of power spectrums based on frequency bins that are less than said frequency bin of said power spectrum beingnormalized, and said second quantity defined by said power spectrum being normalized minus an average of power spectrums based on frequency bins that are greater than said frequency bin of said power spectrum being normalized.

4. A method according to claim 3 wherein said average of power spectrums used in said step of normalizing is based on frequency bins that are greater than said frequency bin of said power spectrum being normalized if said first quantity is not greater than said second quantity.

5. A method according to claim 1 wherein said scoring routine comprises the steps of:

evaluating each said harmonic set in accordance with a set of rules;

assigning a score of zero to each said harmonic set not satisfying said set of rules; and

forming a score for each said harmonic set satisfying said set of rules, said score being determined using said value for each said normalized spectrum in each said harmonic set satisfying said set of rules.

6. A method according to claim 1 further comprising the step of displaying a visible indicator each time said threshold score is achieved across said portion of said plurality of overlapping time-windowed portions.

7. A method according to claim 1 further comprising the step of producing an audible indicator each time said threshold score is achieved across said portion of said plurality of overlapping time-windowed portions.

8. A method according to claim 1 further comprising the step of producing a tactile indicator each time said threshold score is achieved across said portion of said plurality of

overlapping time-windowed portions.

9. A system for detecting manatee vocalizations comprises:

means for detecting sounds in an underwater region;

means for generating a digital representation of said sounds;

means for filtering out sounds at unwanted frequencies from said digital representation, wherein filtered data in a frequency range of interest is maintained;

means for forming a plurality of overlapping time windowed portions of said filtered data;

means for estimating, for each of said plurality of overlapping time-windowed portions, a power spectrum for frequency bins in said frequency range of interest;

means for normalizing, for each of said plurality of overlapping time-windowed portions, each said power spectrum for each of said frequency bins thereof using an average of power spectrums calculated over a plurality of said frequency bins, wherein a normalized spectrum value is defined for each of said frequency bins and wherein each saidnormalized spectrum value associated with broadband noise has a value that is less than each said normalized spectrum value associated with narrowband tones;

means for filtering out, for each of said plurality of

overlapping time-windowed portions, normalized spectrum values indicative of narrowband tones that occur (i) in windows of frequency bins encompassing frequencies lower and higher than each of a lowest resonant frequency of interest associated with manatee vocalizations and harmonics thereof and (ii) with a specified degree of variance with respect to frequency separation therebetween, wherein a resulting number of said normalized spectrum values indicative of narrowband tones are maintained;

means for assigning, for each of said plurality of overlapping time-windowed portions, each said normalized spectrum value from said resulting number thereof to a frequency-based harmonic set defined by a base frequency and resonances thereof; and

means for applying, for each of said plurality of overlapping time-windowed portions, a scoring routine that uses each said normalized spectrum value in each said harmonic set wherein a manatee vocalization is indicated when a threshold score is achieved across at least a portion of said plurality of overlapping time-windowed portions.

10. A system as in claim 9 wherein said means for detecting sounds in an underwater region comprises at least one hydrophone.

11. A system as in claim 9 wherein said means for generating a digital representation of said sounds comprises ananalog-to-digital converter.

12. A system as in claim 9 wherein said means for filtering out sounds at unwanted frequencies from said digital representation comprises a bandpass filter.

13. A system as in claim 9 further comprising a display coupled to said means for applying for displaying a visible indicator each time said threshold score is achieved across said portion of said plurality of overlapping timewindowed portions.

14. A system as in claim 9 further comprising a sound reproduction device coupled to said means for applying for producing an audible indicator each time said threshold score is achieved across said portion of said plurality of overlapping time-windowed portions.

15. A system as in claim 9 further comprising a device coupled to said means for applying for producing a tactile indication each time said threshold score is achieved across said portion of said plurality of overlapping timewindowed

portions.